

Application No. 08/160,965

Docket No. HO-P00965US0

4. (Amended twice) The vaccine of claim 1, wherein said infection is selected from the group consisting of pharyngitis, tonsillitis, skin infections, acute rheumatic fever, scarlet fever, post-streptococcal glomerulonephritis, and toxic-shock-like syndrome.

5. (Amended twice) The vaccine of claim 1 further comprising a purified streptococcal M protein antigen.

6. (Amended twice) A method of immunizing mammals comprising:

administering to a mammal a vaccine comprising, a purified non-proteolytic cysteine in an amount sufficient to confer immunity to a Group A streptococcal infection, wherein said cysteine protease comprises at least one amino acid substitution and said amino acid substitution occurs at the amino acid position selected from the group consisting of Lys145, Gln185, Cys192, His340, Asn356 and Trp357.

Please add the following new claims:

20. The vaccine of claim 1, wherein said amino acid substitution is selected from the group consisting of Lys145→Ala145, Cys192→Ala192, Cys192→Ser192, His340→Ala340, Gln185→Ala185, Asn356→Ala356 and Trp357→Ala357.
21. The method of claim 6, wherein said amino acid substitution is selected from the group consisting of Lys145→Ala145, Cys192→Ala192, Cys192→Ser192, His340→Ala340, Gln185→Ala185, Asn356→Ala356 and Trp357→Ala357.
22. The vaccine of claim 20, wherein said amino acid substitution is Cys192→Ala192 or Cys192→Ser192.
23. The method of claim 21, wherein the amino acid substitution is Cys192→Ala192 or Cys192→Ser192.

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24. The vaccine of claim 1, wherein said amino acid substitution occurs at Lys145.
25. The vaccine of claim 1, wherein said amino acid substitution occurs at Cys192.
26. The vaccine of claim 1, wherein said amino acid substitution occurs at Gln185.
27. The vaccine of claim 1, wherein said amino acid substitution occurs at Asn356.
28. The vaccine of claim 1, wherein said amino acid substitution occurs at Trp357.
29. The method of claim 6, wherein said amino acid substitution occurs at Lys145.
30. The method of claim 6, wherein said amino acid substitution occurs at Cys192.
31. The method of claim 6, wherein said amino acid substitution occurs at His340.
32. The method of claim 6, wherein said amino acid substitution occurs at Gln185.
33. The method of claim 6, wherein said amino acid substitution occurs at Asn356.
34. The method of claim 6, wherein said amino acid substitution occurs at Trp357.
35. A vaccine comprising a cysteine protease peptide, wherein said peptide is selected from the group consisting of SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 13 and SEQ ID NO: 14.
36. A method of immunizing mammals comprising administering to a mammal a vaccine comprising a cysteine protease peptide, wherein said peptide is selected from the group consisting of SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID

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NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 13 and SEQ ID NO: 14.

37. An isolated peptide comprising an amino sequence of SEQ ID NO: 8.
38. An isolated peptide comprising an amino sequence of SEQ ID NO: 9.
39. An isolated peptide comprising an amino sequence of SEQ ID NO: 10.
40. An isolated peptide comprising an amino sequence of SEQ ID NO: 11.
41. An isolated peptide comprising an amino sequence of SEQ ID NO: 12.
42. An isolated peptide comprising an amino sequence of SEQ ID NO: 13.
43. An isolated peptide comprising an amino sequence of SEQ ID NO: 14.
44. A vaccine comprising a purified non-proteolytic cysteine protease, which confers immunity to a mammal against Group A streptococcal infection, wherein said cysteine protease comprises at least one amino acid substitution and said amino acid substitution occurs at the amino acid position selected from the group consisting of Lys145, Gln185, Cys192, His340, Asn356 and Trp357.
45. A method of immunizing mammals comprising administering to a mammal a vaccine of claims 1, 5, 20, 22, 24, 25, 26, 27, 28 or 44 in an amount sufficient to confer immunity to a Group A streptococcal infection.
46. The method of claim 45, the mammal is human.